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Field.  
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2 February 1961

Asso. Prof. Joshua Lederberg  
Department of Genetics  
School of Medicine  
Stanford University Medical Center  
Palo Alto, California

Dear Prof. Lederberg:

Mr. Dunkelman of NASA asked me to send you the enclosed reports on optical cements and UV filters with any subsequent experimental results. On page 53 of NRL Report 4242 you will find the UV transmission curve for a 2-mil film of cellulose caprate. Although, this is the usual thickness of an optical cement layer, thinner films for higher transmission have been used as a cement or cast on polished plate glass from toluene solutions, dried, and stripped with water. A 500 gm sample of cellulose caprate (Eastman Organic Chemical P 7137) is being forwarded under separate cover. I recommend that this material be purified by the procedure in the report for optimum results.

I presume you have a copy of NRL Report 4647 "A Middle Ultraviolet Transmission Filter". Preparation of the nickel sulfate-sorbitol complex was made without the tedious purification of the nickel sulfate as given by Strait et al, JOSA 44, 825 (1954) (I believe their work is covered in a later reference), however, this technique has its drawbacks. I found that a number of batches of "analyzed" reagent were unsatisfactory. The batches which were used had a low iron concentration - 0.0005% or less. I used the technique explained in the report - make a small batch of the complex and watch for any decrease in transmission at 2800A.

Some changes were incorporated in filters made subsequent to the publication of the report. Gaskets for the A-filter were cut from 90 mil cork gasket material (Armstrong MIL-A-6183). Using two gaskets gave a 0.180 in. path length which results in a maximum transmission at 2650A with a minimum leak at 3580A for the combined PDAB filter.

Another change was the solvent used for the cellulose caprate. Toluene was substituted for 1,4-dioxane since the latter may contain peroxides which react with the PDAB. Instead of using the cellulose caprate as a hot-melt cement, the filtered solution (0.2gm/ml) to which PDAB was added (20mg/ml) was poured onto polished plate glass, spread slightly depending on the desired thickness of the film, and allowed to dry. A number of films were cast in this manner and observed on the spectrograph with the A-filter to obtain optimum characteristics. The best filters had 0.7D at 2650A and 2.8D at 3580A. The desired film was pressed onto the A-filter with a high-silica glass disc and the edges

sealed with tape. By this method there seems to be a negligible loss in transmission from internal reflections and an assuredness of the filter's transmission characteristics.

If I can be of further help, please let me know.

Very truly yours,

*Donald E. Field*

DONALD E. FIELD

Organic and Biological Branch  
Chemistry Division

Copy to:

L. Dunkelman

*See Dunkelman  
copy.*